$3.00

Contents:

Editorial 2
Index to advertisers 3
Regional News 4
News From Barsons 5
A Letter 8
SGM Report 9

DISK FEATURE:
-Disk Drives Part 2 10
-Data Transfer Between Tape and Disk 14

Hall of Fame 16
BASIC Values 17
Printer Translations 19
1 MHz Bus 22
HELP 25
Measuring Temperature 29
SCOOP - New Acorn NEUTRINO 31
Chinese Characters 32
Toolbox - Review 37
Local meetings... 40

BBC 微型 计算机 用者 联会

THE BBC MICROCOMPUTER USERS GROUP OF NZ INC

NEWSLETTER

VOLUME 2 NUMBER 3 APRIL 1984

EDITORIAL

Geez have I been busy this month!

FURTHER BBC MICRO DOCUMENTARIES

Another series of BBC programmes, "Making the Most of Your Micro", is scheduled on TV2 on Sundays at 4-40pm. Watch your Listener for details.

DISCOUNTS

Stephen Williams of FG Software is offering a 10% discount on Acorn, Micro Power, Digital Fantasia, BBC and IJK software to User Group members. Please remember to quote your membership number.

I would be interested to hear from anyone who knows of, or is prepared to offer, similar discounts to members. Local groups may wish to consider selecting a business manager to investigate such possibilities and possibly solicit advertising for Beeblet. Remember, with well over 300 members nationally, the group as a whole could provide a worthwhile market for a wide range of computer related goods and services. Advertisers please note that advertising attracting the most attention in Beeblet seems to be the more professional looking efforts.

MEMBERSHIP FORMS

Included within this issue is a copy of the membership form. This is for you to pass on to friends, interested neighbours, or any who infringes copyright by photocopying this magazine. Please let me know if you want more forms.

Increase our membership - I have it on expert opinion that this is a great mag, and more members mean longer and cheaper print runs which in turn will keep costs down.

We can't be so very far behind in techniques published either - the previous editor (source of the above expert opinion..) was often heard to exclaim in delight as an article arrived in the box from one of you, prepare it for the next issue of Beeblet, only a week or two later to give a groan as an airmail copy of some UK magazine turned up in her letterbox with another on the same thing!

S.G.M. AND A.G.M.

I have included a copy of the minutes of the recent SGM in this issue. I strongly urge members to think about what issues they may wish to raise, or have other people raise, at the AGM. Read through the Constitution too if you have time. Those of you with some definite ideas (eg. a student membership rate) should consider sending them in for inclusion in the next Beeblet - particularly if they are in the form of motions, with supporting arguments. This will permit a well informed discussion and any necessary background research to be completed.

WORKSHOPS

A regular series of monthly workshops is now underway in Wellington. Material is starting to flow from these onto the pages of Beeblet. I know that other centres are also running workshop sessions : many of us would be very interested in reading articles based on them. Perhaps the local organisers could arrange for someone to take and write up notes.

REGULAR COLUMN - Technical Answers

Tony K. of Auckland has offered to run a technical question and answer column. Yes, Tony I think it is a great idea! We could perhaps have an informal panel of people with particular interests / areas of expertese prepared to field queries from time to time, or even to submit a regular column. Is anyone else interested? Anyway, if you've got a query or problem, send in the details. Even if it seems trivial, you are probably not the only one bothered by it!

WELCOME TAPE

Anton has suggested that the group should prepare a local welcome tape for new members (and anyone else that wants it.) I would be interested in your views about what should be on the tape - especially those of you who have recently joined the club and/or are in the stages of coming to grips with your Beeb.

ADVERTISERS INDEX

Business World	28
F. G. Software	7
Pirimai Pharmacy	12
Pitmans	18

NEXT MONTH

Structured Programming
Italics
Utilities
View printer driver
Reviews
? Games?

BEEBLET LISTINGS.

It has also been suggested that we should have our listing available on tape or disk for those that want them (and are willing to pay for the service). I should be most intersted to hear from anyone with the equipment and expertese to provide such a service in a professional manner.

APRIL COMPETITION.

The response was not entirely overwhelming. One entry is included within these covers - I imagine I might be able to persuade the committee to shell out on a chocolate fish or something. I'm thinking about the other one - a "gap inserter" for BASIC programs from Steven R. of Wellington.

REGIONAL ROUNDUP.

Christchurch:

Monday	30 April	General Members Forum
	14 May	Wordwise presentation
	28 May	BBC use on the industrial scene
	11 June	Sessions on graphics and sound
	25 June	More graphics and sound
	9 July	General Members Forum
	23 July	Printers

Sounds like a lot of potential Beeblet articles!

Waikato:

Last Thursday of each month. Ideas for meetings -
-an invasion of an Auckland Users Group Meeting
-an address on 'digitalker'
-a visit to the Te Awamutu High network -a look at the WTI BMC network (Heresy!)
-a demonstration of 'Visicalc' or similar

Other ideas would be welcome.

WHAT ARE THE REST OF YOU DOING?

NEWS FROM BARSONS

6502 CO-PROCESSOR

Probably the most significant bbc event of this month has been the arrival of the first of the 6502 co-processors from Acorn. The (considerable) delay has been due to a reliability factor when the processor and BBC, working asynchrously, are connected together via the Tube. At the outset of the development programme, the theoreticians said that the concept was impossible. Acorn proved them wrong though, at first, the two machines could not work reliably for more than a matter of hours. The required reliability level was months of continuous operation, hence the delay.

Since full production of the 6502 late in February, only seventy five have been produced of which four have been sent to New Zealand. These four have been installed in schools which have been waiting since as long as April 1983 for level III Econet networks. Further quantities should now be coming through at an increasing rate. The retail price for the 6502 is $880.00.

Z80 CO-PROCESSOR

Production of the Z80 co-processor is a little behind that of the 6502. It is not expected that quantities of this machine will arrive in New Zealand before June at the earliest.

The Z80 will cost $1215.00 and will be accompanied by free CP/M software. This will include:

DaybooK,	General Ledger
Program Generator	
File Plan,	Data Base Management System
Memo Plan,	Word Processor
Profit Plan,	Spreadsheet
Graph Plan,	Graphics Display

as well as CIS COBOL, BBC BASIC and BASIC 2, a version compatible with Microsoft BASIC 5.1

ELECTRON

The (long awaited) Electron is due for release in the first week in May. The basic package includes an external power supply and transformer, a User Guide, a Welcome cassette and a book, "Programming the Electron". As yet no peripheral ports, except for cassette and monitor, are available for the mahine although the expansion unit to take joysticks, printer, disc etc is expected shortly. The retail price is $795.00 and, if the UK experience is anything to go by, if you want one put your order in to a BBC dealer as soon as possible.

GENERAL SOFTWARE

On the software side, the BBC have released several new packages including a Rom based spreadsheet, Ultracalc. The multiutility suite of programs, Toolbox, is also very good and should be a must for novice and experienced programmer alike. Barson Computers have also been appointed distributers of Musicsoft software from the UK. Four programs are available, "The Synth" and "Keyboards" for $39.95 and "Musictools" and "Pieman" at $35.00. All four dics are excellent both for home use and education.

BUSINESS SOFTWARE

Most of you will have seen the advertisements in Micro User and Acorn User for business software from Acornsoft. At the time of writing, I have not received inspection copies - probably because the publicity has preceded the release of the products on the market. ("Is that new?" I hear you say !!). In the absence of good business software, Barsons have commissioned a suite of programs which include general ledger, debtors ledger and invoice which will handle accounts of up to $10,000,000 and nearly 800 customers. The modules will retail for $195.00 and should be available by the beginning of June.

EDUCATION

Barson educational software is also available in Music, the BBC Aural Training System, Intermediate (School C) Science, Geography, French and German. All programs are disc based and are available from BBC dealers or direct from Barsons.

The Editor of AEUG (the Acorn Educational User Group magazine launched last month) invites schools and individuals to subscribe to the magazine and support the venture by contributing articles and public domain software. Contact Peter Revell, Rangitoto College, Auckland.

Joe Joyce

****

NB. A high proportion of Beeblet subscribers have indicated an interest in education on their membership forms. I would also welcome articles, reviews, programs and even the odd note.

FGFGFGFGFGFGFGFGFGFGFGFGFGFGFGFGFGFGFGF
FG FG
FG FG Software PO Box 6662 Auckland FG
FG FG

NEW! from FG Software:-

* SHAREMARKET - For 1 to 4 players,this sharemarket simulation game is very realistic and fun to play
* MORSE CODE TUTOR - (Speech ROM compatible) provides lessons(varying speeds),tests etc.
* STAR TREK - Rid the universe of Klingons! This is an old favourite but well-done.
  All above titles $19.95 (cassette) or $27.95(disk)

ALSO:

* AUTO-AUTHOR - Analyses input text then creates output according to the "rules" it derives.A whole new idea in computer games.
* MUTANT DEFENDER - A shoot-em-up arcade game with the weirdest aliens we've ever seen! (both $19.95 cassette or $27.95 disk
* MENU PLANNER - Select your menu from the wide selection supplied,and the program will produce a printed menu plus a shopping list for you.A novel idea well executed. ($24.95 cassette or $32.95 disk)
* 747 flight simulator,new improved version with ILS etc.(joystick or keyboard) ($24.95 cassette or $32.95 disk)
* PIRATE ADVENTURE - Full-scale adventure
* VAMPIRE ADVENTURE - Solve the mystery of the Count's castle. (both above $19.95 cassette or $27.95 disk)
* GORF - 4 different screens of machine code invaders.4 games in one.
* WOLFPACK 3 - Tactical,Graphic space battle
* MISSILE ATTACK - Defend your cities from descending missiles;a real arcade favourite

FG Full range of Acorn,IJK,Micro Power FG
FG SEND SAE FOR OUR FREE CATALOGUE FG
FGFGFGFGFGFGFGFGFGFGFGFGFGFGFGFGFGFGFGF

LEARNING COMPUTING WITH THE BBC - INTRODUCTION

Neil M.   Wellington

In April 1983 my wife and I purchased our BBC 'B' with 0.1 OS after much fear and trepidation of moving into the strange world of COMPUTERS!! Neither of us had touched a micro before, or even the keyboard of a mainframe terminal, in our lives.

We had listened intently to all the news and propaganda of micros - watched the "right" TV shows and finally succumed to advertising hype of the British computer mags that had suddenly proliferated in newstands and bookshops. (We had already been persuaded by THOSE-IN-THE-KNOW to stay away from American sourced machines as the market was too volatile..)

The BBC won on the basis of keyboard, graphics, sound and the ability to grow, with our requirements, to a substantial machine. After buying the Beeb we spent the next three months or so playing games, then worked up the courage to key on listings from any magazine (ouch$$$) that had them for our machine. Much fun was had trying to de-bug (technical term!) these as we were totally ignorant of BASIC. A number of the listings already had errors anyway...!

Then we joined the NZ user group and (lived happily ever after....sorry, Ed.) rapidly came to the conclusion we were out of our depth. We couldn't understand most of the newsletter (and still can't!). Other than the editorial, the reviews and letters of course.

Out of the blue in September there came a life-saver : the BBC MICRO USER magazine. Now here was a publication that is in our language : BASIC MAN-IN-THE-STREET LINGO (BMITSL or BPITSL if your a feminist!). I won't go into a free ad for the magazine (you already have...Ed) but it has been more help to my wife and I than our own user group magazine - which is a shame.

The problem is how to solve that?!! More next month.

Editors Note: Beeblet is largely what you, the members, make it - or perhaps allow others to make it. I will welcome, and act upon, any suggestions about how to make the mag more useful to the wider membership. This is after all a newsletter, not a learned journal for a hallowed scientific institution. (That reminds me - David E. of Tauranga has suggested that Beeblets don't eat frogs as suggested on the February cover - they eat bannanas and dead flies). Anyway, Neil has started the ball rolling.....

S.G.M. REPORT

Some lively debate featured near the end of the S.G.M. held in Wellington on Thursday 29 March. The minutes are as follows:

"Chairman: Warren Willis, President.
Seventy-eight members present.

The Chairman initially called for any apologies. There were none. The first motion was then introduced.

MOTION 1: That clause 1g of the Constitution of the BBC Microcomputer Users Group of N.Z. be altered to read: "The financial year of the group shall be in any year from 1 January to 31 December of the same year."
The Chairman explained the reasons for this amendment in detail. There was no discussion. The motion was then put and carried unanimously.

MOTION 2:That the financial year shall run from 1 April to 31 December 1984.
There was no discussion. The motion was put and carried unanimously.

MOTION 3: That the 1984 subscription for the period 1 April 1984 to 31 March 1985 be set at $30.00 annual fee plus $5.00 joining fee, subject to ratification at the forthcoming 1984 A.G.M.
The Chairman explained the reasons behind this motion. He then called for discussion. Some discussion followed, mainly concerned with the potential effects of not raising the subscription rate. The idea of a student rate was raised. The chairman suggested this be treated as a separate motion. The motion was then put and carried with 2 abstentions.

It was then moved by Mr. Dennis Cribb that a subscription rate of $20.00 per annum be set for primary and secondary school students. This was seconded by Anton Erasmusan. Vigorous discussion followed. It was pointed out that it is not in order to raise a motion without previously publishing it. The Chairman felt that the motion was sufficiently relevant to Motion 3 to proceed. The motion was then put and lost, not unanimously. Mrs Elaine Scoble (Treasurer) then put a Notice of Motion that the Executive be asked to investigate the feasibility of classes of membership and report to the A.G.M. It was also suggested that the Executive determine the number of student members.

The meeting concluded at 8.45pm."

DISK DRIVES PART 2

Bryan H. (& Duncan) Wellington.

In part 1 (November issue), the mechanical workings of a typical disk drive were described. In addition some general information was given on how the disk drive is controlled by the computer. This article provides more details about disk recording and the operating system that controls the disk.

Recording Information on a Disk.

A disk drive uses a different recording technique from that of a tape recorder. Data is represented by magnetising in one direction or another. Each magnetic reversal (pulse) represents a 1 bit, and the absence of a pulse represents a zero bit. This recording technique is called "Non Return to Zero" (NRZ to the initiated).

There are two popular ways of coding bytes of data as a sequence of zero and one bits. With single density (bit density rather than track density) recording, two pulses per bit of data are required. A constant stream of pulses called clock bits define the start of each data bit. The presence or absence of another pulse between two clock bits, represents the 1 or 0 data bit values respectively. Double density recording does not require the clock pulses between each data and so a higher density of data is possible. The 8271 Floppy Disk Controller chip (used in all standard disk upgrades for the BBC) only supports single density recording. However, some companies have either released, or are developing systems with double density controllers.

Inside Sectors.

The BBC disk drives that are available in New Zealand, record 80 tracks per side of a disk. Each track is divided into a number of sections called sectors. For the 5.25" disks (the most commonly used size on the BBC) the possible choices of sectors per track are 1, 2, 5, 10 or 18. The designers of the BBC decided on 10 sectors.

Data in each sector is coded as a continuous sequence of bits, 8 to a byte. To avoid errors in reading and writing, two consistency checks are made.

1) Each sector is labeled so that there is no confusion as to which track and sector is currently being read or written. The

label contains the track and sector numbers, as well as the number of data bytes in the sector. Before each read or write operation, the controller checks the label to ensure that it is reading the correct sector.

2) Both the sector label and the data have additional two byte "Cyclic Redundancy Checks" which are generated by the disk controller when it writes the sector. The CRC is calculated from the data in such a way, that if data is corrupted during a read operation, it is extremely unlikely that the CRC would be correct. The User Guide (page 399) shows the CRC calculation used in the Cassette Filing System.

Both these checks are performed by the disk controller automatically. If an error is detected by the hardware, an indication is passed on to the operating system, which then takes the appropriate action (displaying an error message, retrying the operation, etc). The information required for these checks reduces the amount of usable space on a track from 3123 bytes to 2560, but adds greatly to the reliability of the system.

The sector labels are written during the formatting of a blank disk. At the same time, all the data on the disk is erased. The writing process is checked by re-reading. The labels remain until the disk is re-formatted, but the data area can be re-written as often as necessary.

The data is seperated from the sector label by "blanks", which allow time for the recording head to switch from read to write mode. The blanks consist of syncronising data (either &00 or &FF).

The Disk Catalogue.

The catalogue is a very important part of a disk. The user can use it to determine which files are on the disk. The Disk Filing System uses it to find which track and sector a particular file is located in, as well as storing other information such as size, load address, etc. The layout of this information in the BBC catalog is described in the Disk System Users Guide (page 79).

The designers of the BBC DFS limited the size of a disks catalog to 2 sectors, which only allows for 31 files per side.

The Disk Filing System.

The disk filing system is a collection of routines which manipulate the data stored on the disk. Many of the routines are accessible as machine code subroutine calls from programming languages such as

BASIC, or via operating system commands typed at the keyboard. The following is a list of some of the DFS commands available.

1) Information :- *help

2) Catalogue Manipulation :- *cat, *info, *opt, *dir

3) Disk to Memory :- *load, *run, *exec

4) Memory to Disk :- *save

5) File Deletion :- *delete, *wipe, *destroy

6) File Displaying :- *type, *list

7) Disk to Disk Transfer :- *copy, *backup

8) Blank Disk Preparation :- *format

9) Miscellaneous :- *drive, *access, *enable, *compact, *title, *dump, *verify

In addition, languages such as BASIC, translate most of their file handling commands (e.g, LOAD, CHAIN, SAVE, OPENIN, BGET, PTR#, etc) directly into operating system calls.

ACCESSORIES and software supplies:-

Have you seen the AB2 Designs Package -
an extremely versatile graphics utility on Disc?

Also the new Educational software from WESOFT in Western Australia?

Printers -- Parallel Interface types from $595

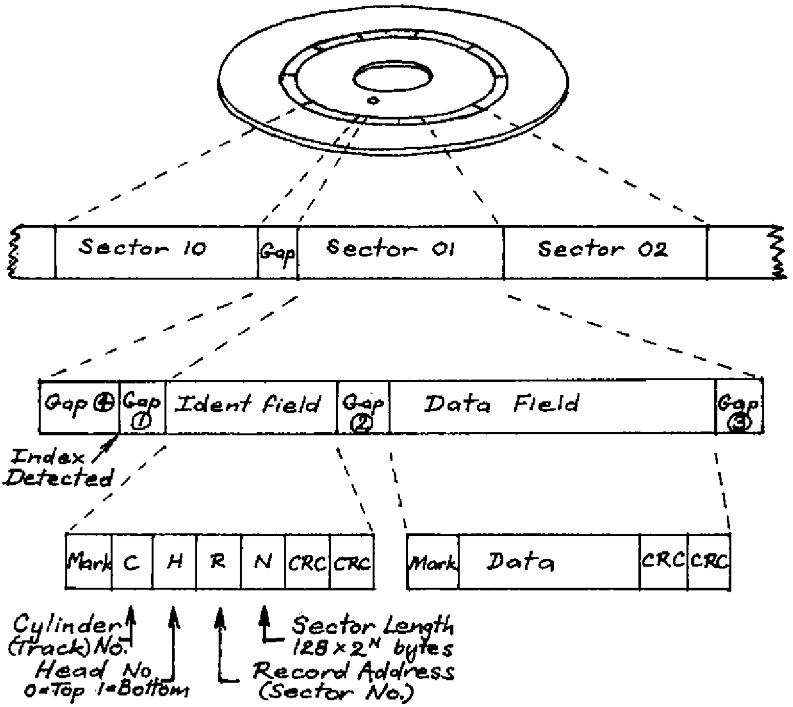
Now in stock:
LVL Double Density upgrade $350
-or ask for an exchange price if you already have a Single Density System

RH Colour Lightpen	$198
BBC Speech Synthesiser	$199
Acorn Joysticks	$55

For these and any other enquiries contact :-

Bob Brady at
phone 439016

Pirimai Pharmacy Ltd.
Pirimai Plaza
NAPIER

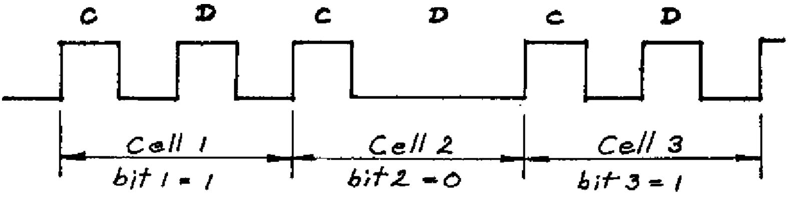


Number of bytes: Total on track 3125 used 2560:

Gap 1		ID field	Gap 2		Data field	Gap 3		Gap 4
Ones	Sync		Ones	Sync		Ones	Sync	Ones
16	6	7	11	6	259	21	6	30

Note: In gaps 1, 3, 4 the number of "Ones" are programable.

B. B. C. TRACK FORMAT



Single Density Recording Format
C = Clock D = Data

DATA TRANSFER BETWEEN TAPE & DISC

G.C.F.

There are no built-in facilities to copy data files between tape and disc. Thus when the (ex)Editor was sent in a program with accompanying DATA file on tape... Fortunately I had already a utility, though still in experimental stage and full of diagnostic code. Needless to say, the (ex)Editor's reaction was Publish!, even if only to demonstrate that it was possible for a program to use both Tape and Disc files at the same time.

This program will not copy protected software, nor is it designed to. It is a method of transferring your data files from tape to disc when your bank manager permits (or vice versa - get disc files to tape when the repossession order is made on your new drives!!)

USER NOTES:
a) CHAIN in this program.
b) Select the required option, which is "1" for transferring data files from tape to disc
c) You are next asked for the names of both Input and Output files.
d) The program will now attempt to open both files. If the output file is to be on disc, the program checks that a file of the same name does not already exist. If there is, you get an error message.
e) Full details are given on each file at the end of a successful transfer.
f) When the program finishes it makes the disc system the current file system.

PROGRAM NOTES:
a) The MODE can be set to any Mode you choose, but this will affect the amount that can be read in from a file at a time.
b) The maximum area of RAM available as a buffer is calculated with an allowance for the variable heap and procedure stack used by Basic.
c) Both files are opened before any copying is done.
d) As much in the input file is read as the is space for in RAM before being transferred to the output file. This is repeated until the file is exhausted (jargon for saying there is nothing left to be read from the Input file).
e) The limit of only one *FX call per line has been got around by use of calls to the operating system routine OSCLI (as explained in Dec/Jan'83 p.16).
f) Full information on the tape and disc files is provided using *OPT1,2 and *INFO<afsp>. Note that these options MUST be activated when the relevant file system is current.
g) The program is constantly swapping between the two filing systems by using PROC_oscli(type_A$) and its "B" counterpart.

```
  10 REM tape/disc & disc/tape data transfer
  20 MODE6
  30 size%=HIMEM - LOMEM - 300
  40 DIM buffer% size%, msg_area% 20
  50 PRINT TAB(0,3)"Please enter:"
  60 PRINT TAB(12,7)"1 - for Tape to Disc"
  70 PRINT TAB(12,9)"2 - for Disc to Tape"
  80 REPEAT
  90   *FX15,1
 100   R$=GET$
 110   ok%=FALSE
 120   IF R$="1" THEN type_A$="TAPE" :type_B$="DISC" :ok%=TRUE
 130   IF R$="2" THEN type_A$="DISC" :type_B$="TAPE" :ok%=TRUE
 140   UNTIL ok%
 150 CLS
 160 PRINT TAB(2,5)"Filename of ";type_A$;" input ";:INPUTLINE,name_A$
 170 PRINT TAB(2,9)"Filename of ";type_B$;" output ";:INPUTLINE,name_B$
 180 PROC_oscli(type_A$)
 190 IF type_A$="TAPE" THEN *OPT1,2
 200 A%=OPENUP(name_A$)
 210 PROC_oscli(type_B$)
 220 IF type_B$="DISC" THEN PROC_check_disc(name_B$) ELSE PROC_oscli("OPT1,2"):PR
OC_oscli("OPT2,1")
 230 B%=OPENOUT(name_B$)
 240 H%=buffer%+size%
 250 REPEAT
 260   I%=buffer%
 270   PROC_oscli(type_A$)
 280   REPEAT :?I%=BGET#A% :I%=I%+1 :UNTIL I%>H% OR EOF#A%
 290   IF EOF#A% THEN H%=I%-1 :finished%=TRUE :CLOSE#A% ELSE finished%=FALSE
 300   PROC_oscli(type_B$)
 310   FOR I%=buffer% TO H% :BPUT#B%,?I% :NEXT
 320   UNTIL finished%
 330 CLOSE#B%
 340 IF type_B$="DISC" THEN PROC_oscli("INFO "+name_B$) ELSE *DISC
 350 END
 360
 370 DEF PROC_check_disc(N$)
 380 IF OPENUP(N$) THEN PRINT' N$;" already exists on disc" :CLOSE#0 :STOP
 390 ENDPROC
 400
 410 DEF PROC_oscli(C$)
 420 LOCAL X%,Y%
 430 X%=msg_area% MOD 256
 440 Y%=msg_area% DIV 256
 450 $msg_area%=C$
 460 CALL &FFF7
 470 ENDPROC
```

CODING NOTESa) DIM statement is being used to reserve to areas of memory rather than to dimension arrays. The memory addresses of the first byte of these areas is given by buffer% and msg_area%.
b) INPUTLINE is used rather than INPUT to avoid any problems with commas (",") in filenames. (See UG p.278 or Jan'83 mag p.16)
c) The indirection operator "?" is used to poke bytes into the buffer and peek them out again. (UG chapt.39) The string operator ("$") is also used.
d) Using BGET and BPUT means that we are reading and writing the files byte by byte rather than field by field. This avoids having to know what is is the file in terms of strings, integers and 'real' numbers.

VARIABLES:

Most of the variables have easily understood uses. Details on the more obscure:

size%	This is the number of bytes 'free' after the size of program and an allowance for miscellaneous overheads.
buffer%	The address of the first byte of the program buffer area used as temporary file storage. The length is actually size%+1 (UGp.237).
H%	This is the address of the last byte of the buffer area when reading the input file. Note that H% is recalculated before writing out the last part of the output file.
I%	This is the address in the buffer area of the particular byte to 'peek' or 'poke'.

* * *

HALL OF FAME

PUBLISHER:	GAME	HISCORE	SCORER
Acorn	Arcadians	15,000	Felix G.
	Countdown	127	Tim R.
	Hopper	20,908	Brett A.
	Meteors	10,000	Felix G.
	Monsters	50,320	Brian G.
	Philosophers Quest	Solved	SJ,DE,AJ
	Planetoid	370,950	Stevie H.
	Rocket Raid	140,777	Mark R.
	Snapper	250,000	Susan
	Starship Command	1312	David E.
Alligat.	Bug Blaster	37,642	Steve W.
Dr. Soft	'747'	205	Steve W.
	Gorf	18640	Steve W.
FG Soft.	Mutant Defender	6,900	Steve W.
Level 9	Colossal Cave	687	Steve W.
	Dungeon Adv.	330	Anne
	Snowball	550	Gavin
Prog.Pow	Danger(1xB,Lvl 1)	82789	Steve W.
	Killer Gorilla	91,000	Susan
		32,660	Sarah (8yrs)
	Super Invaders	19,610	Brett A.
Sup.Soft	Alien Dropout	24,200	David E

* * *

BASIC VALUES:

The computer stores BASIC keywords in 'tokenised' form which takes up less space, and saves it time too. (Compare the space for 'ENVELOPE' against the token 'E2'. For those looking through memory dumps, or files from disc (via *DUMP), here is a table of the values used, in numeric order (and hex):

80	AND	A0	EVAL	C0	LEFT$(	E0	END
81	DIV	A1	EXP	C1	MID$(	E1	ENDPROC
82	EOR	A2	EXT	C2	RIGHT$(	E2	ENV.
83	MOD	A3	FALSE	C3	STR$(	E3	FOR
84	OR	A4	FN	C4	STRING$(	E4	GOSUB
85	ERROR	A5	GET	C5	EOF	E5	GOTO
86	LINE	A6	INKEY	C6	AUTO	E6	GCOL
87	OFF	A7	INSTR(	C7	DELETE	E7	IF
88	STEP	A8	INT	C8	LOAD	E8	INPUT
89	SPACE	A9	LEN	C9	LIST	E9	LET
8A	TAB(	AA	LN	CA	NEW	EA	LOCAL
8B	ELSE	AB	LOG	CB	OLD	EB	MODE
8C	THEN	AC	NOT	CC	REN.	EC	MOVE
8D		AD	OPENIN	CD	SAVE	ED	NEXT
8E		AE	OPENOUT	CE		EE	ON
8F	PTR(rt)	AF	PI	CF	PTR(left)	EF	VDU
90	PAGE(rt)	B0	POINT(	D0	PAGE(left)	F0	PLOT
91	TIME(rt)	B1	POS	D1	TIME(left)	F1	PRINT
92	LOMEM(rt)	B2	RAD	D2	LOMEM(left)	F2	PROC
93	HIMEM(rt)	B3	RND	D3	HIMEM(left)	F3	READ
94	ABS	B4	SGN	D4	SOUND	F4	REM
95	ACS	B5	SIN	D5	BPUT	F5	REPEAT
96	ADVAL	B6	SQR	D6	CALL	F6	REPORT
97	ASC	B7	TAN	D7	CHAIN	F7	RESTORE
98	ASN	B8	TO	D8	CLEAR	F8	RETURN
99	ATN	B9	TRUE	D9	CLOSE	F9	RUN
9A	BGET	BA	USR	DA	CLG	FA	STOP
9B	COS	BB	VAL	DB	CLS	FB	COLOUR
9C	COUNT	BC	VPOS	DC	DATA	FC	TRACE
9D	DEG	BD	CHR$	DD	DEF	FD	UNTIL
9E	ERL	BE	GET$	DE	DIM	FE	WIDTH
9F	ERR	BF	INKEY$	DF	DRAW	FF	OSCLI

Take the following line-   20 Mode 6: CLS: PRINT TAB(5,12)"Hi"

```
line20  no. bytes  Mode  space  6  : space  CLS  :  space
00 44    18         EB    20    36 3A   20   DB  3A   20

PRINT space  TAB( 5  ,  1  2  )  "  H  i  "  carriage rtn
F1     20     8A  35 2C 31 32 29 22 48 69 22      0D
```

BBC SOFTWARE

MAKING THE MOST OF THE MICRO

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FURTHER INFORMATION

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PRINTER TRANSLATIONS:

Anne F

One of the features of the March combined BBC/ Wellington Microcomputing Society workshop was a session led by Anne on printers. Anne has summarised the main points in the following article -

HOW DO I TURN MY PRINTER ON?

There are two ways. VDU 2 is the command to put in a program. If you want a listing, a <CTRL B> will turn it on. That is, press CTRL and B at the same time. Using VDU2 in immediate mode to turn it on means that "VDU2" will appear on your paper. To turn it off again, VDU3 or <CTRL C>. If you were wanting to run a program and remembered that there was no VDU2 command in it, run it by:

```
RUN <CTRL B> <RETURN>
```

POPULAR QUERY:

"I have a Brand "X" printer which is supposed to be an Epson look-alike; is it really? What does that mean?"

If your printer is touted as an Epson clone or look-alike, this means that software developed for the Epson (printer-drivers, screen dumps etc) should run on your printer without modification. To check this, all you need to do is obtain either an Epson manual, or an advertising sheet which has all the 'ESCAPE' codes listed on it, and compare these against those in your manual to see that they do the same thing.

I DON'T UNDERSTAND MY MANUAL:

Apart from the Japanese English that is, which crops up in so many manuals for other machines (eg knitting machine!) that it must be an Industry Standard by now. I have had access only briefly to most of the printer manuals referred to below, in some cases with a printer as well to test things out but not in others, so may not have all the major variants in use by different manuals.

Printer codes are often referred to as "ESCAPE codes". This is because usually the code has to be preceded by an "ESCAPE" command! (How else would you make the printer sit up and notice that you were now wanting it to do something other than print out what you're sending it?) This is often abbreviated to "ESC" in the text. If you look down the VDU code summary in the UG you will find in the ASCII abbreviation column an "ESC", with, in the decimal column, "27". This 27 is what has to be sent to the printer whenever ESC is required. (Or &1B if you insist on sending values down in hex)

First here is a sample from an Epson manual demonstrating Pica vs

Elite characters (ie 10 vs 12 characters per inch), with its translation into BBC Basic alongside, then an explanation. Useful pages to have your Beeb's User Guide open at will be p.378 or 507, and p.490 throughout these examples.

```
10 LPRINT CHR$(27);"M";      10 VDU1,27,1,77
20 LPRINT "Elite size!"      20 PRINT"Elite size!"
30 LPRINT CHR$(27);"P";      30 VDU1,27,1,80
40 LPRINT "Normal size"      40 PRINT"Normal size"
```

This may have been described elsewhere in the manual as:
ESC + M to get elite, and ESC + P for pica.
Line 10: The printer requires a 27 (or "ESC") and a "M" to switch on elite. The ASCII value of "M" is 77. You can find this out, if it isn't somewhere in the printer manual, by looking through UG p.490 for "M" - it's in column 70, and 7 down. Line 30 is sending an ESC plus the ASCII value of "P", or 27 plus 80.

The Beeb distinguishes between characters to be printed out (on screen, printer,...) and those which the printer only is to action. It therefore supplies you with a VDU command that allows you to distinguish. eg:
VDU 121 will print a "y" on the screen or printer.
VDU 1,121 means that the printer will be expected to do something different. The printer is a computer in its own right, with its own ROM and RAM etc; you are programming it via the Beeb. To ensure that letters, numbers etc are only sent to the printer, rather than actioned in some other way by the Beeb, each number must be preceded by a "1".

Thus the translation of ESC + M, or 27 + 77, to BBC Basic is VDU1,27,1,77. And from ESC (or CHR$(27)) "P" is VDU1,27,1,80. OKay?

Another way commands have been described can be illustrated by this one from the Logitec manual to turn Italics on:
ESC + 4 [(34,B4)H,(52,180)D]
The relevant details here are the equivalent to "LPRINT CHR$(27);"4"
so perhaps you can make the translation instead to:
VDU 1,27,1,52
Rather than have to look up a table to find the ASCII value of "4", it is given in this example - it's the third number in the square brackets!

VARIABLE CODES:
By this I refer to codes which allow you some say in their effect. The most likely one you use will be for line feeds other than the standard 6 or 8 per inch, as for graphics work and screen dumps.
To achieve line feeds of different heights on a CItoh means use of

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P.O.Box 9592,
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As an enthusiastic group of users, we think the Beeb is one of the most versatile micros available. It is designed to grow with you, in terms of ease of expansion of memory, addition of peripherals and user-invented equipment; and has a well-structured BASIC for learners and experienced people to use. It is also one of the 5 micros recommended for use in NZ schools.

THE USERS GROUP - AIMS:

1. To provide an independent forum within NZ for the exchange of information, ideas, experience and expertise.
2. To assist users - both beginners and more experienced - to take advantage of the powerful capabilities of the BBC micro.
3. Common Interests - people with interest in business systems, educational, experimental and technical ideas are able to exchange views with other members.
4. Problem solving - the Users Group represents a large resource of skills, and can pool that knowledge.
5. Discounts - bulk buying has allowed some discounts on items.
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These aims are primarily focussed through the monthly newsletter.

THE NEWSLETTER:

This is 32 pages each month (except January) of programs, reviews of commercially

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APPLICATION FOR MEMBERSHIP 1984/5 P.O.Box 9592, Wellington

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____

Occupation:______________________ School or Employer:______________________

BBC serial #______________ model B / A / Electron / Other______________

SCREEN type: TV / Video / RGB . PRINTER (model):______________

DISC: Drive (single / dual). Capacity ________ Kbytes.

Other Peripherals:______________________________________

Operating system: 0.1 / 1.0 / 1.2 Can already program / am learning on the BBC

APPLICATIONS OF INTEREST:

☐ Games ☐ Word processor ☐ Radio ham (call sign:

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available software, programming techniques, as well as the means for setting up special interest applications (business, education, radio hams,...)
It also offers solutions to members' problems, hints and ideas, plus information on local groups, discounts etc.

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Auckland: 2nd Wednesday of the month, VHF clubrooms, Hazel Ave, Mt Roskill. Ph. Dave Fielder 770-630 x 518 (bus)
Hamilton: last Wednesday of the month, 5.00 pm, Waikato Tech Staffroom B-block. Ph Peter 393-990
Tauranga: every second Wednesday. Ph Chris & Jane 65-076
Hawkes Bay: alternates each month between Napier & Hastings. Ph Kendall 435-624 Napier, Mitch 778-235 Hastings, Bob 446-955 Taradale.
Taupo: Ph. David 84-215
Wellington: last Thursday of the month, 7.30 pm, Staffroom, Correspondence School (first floor), Portland Cres. Ph. Anton 286-289
Christchurch: fortnightly Mondays 6.30pm Hagley High School. Door charge $1 reduced for students. Ph. Michael 582-267

MEMBERSHIP:
1. The membership fee for the subscription year 1/4/84 to 31/3/85 is $30.00.
2. For new members there is a Joining fee of $5.00 as well. They are also sent a copy of the Constitution, a tape with some of the longer or more interesting programs from the 1983/4 year, plus ALL back-issues of the current subscription year, including Feb & March '84.
3. Auckland & Wellington have a further $5.00 levy to cover meeting costs.
4. Members are also issued with an ID card which doubles as a name tag at local meetings. Extra cards for other members of the family can be produced at $1.00 each if this is indicated on the membership application (over).

If you are interested in becoming a member, fill in the membership form overleaf and mail it to the above address, or write for one.

code expressed in the manual as:
ESC T n1 n0   N/144 Inch line feed
n1 and n2 are described as a two digit decimal number between 01 and 99. So to get line feeds of 20/144ths as used for this magazine, n1 refers to the "2", n0 to the "0" of "20" so you will be sending down ESC + "T" + "2" + "0" each separated by a 1:
VDU1,27,1,84,1,50,1,48
If you wanted a line feed of 4/144ths, you would need to send n1 as "0" and n0 as "4".

This is a requirement of all variable-type sequences; that if the printer expects a 3-digit number, you must send it 3 digits even if the first one or two are zeroes.

The Shinwa manual has some codes that require a null or 1 to be sent as well. A fictitious example based on this requirement:
To set subscripts, ESC + "M" + 1
To unset subscripts, ESC + "M" + null (or 0)
This requires VDU1,27,1,77,1,1 to set on,
VDU1,27,1,77,1,0 will set it off. Not, as you would expect:
VDU1,27,1,77,1,49 on or VDU1,27,1,77,1,48 off.
Don't ask me why, but that's the way it worked!

I enjoy programming printers rather more than programming computers, so there will be more on using printers in later issues in which I will try to refer to more than one brand of printer, or keep general enough for you to apply to your own. However, this requires a library of manuals so if you have somehow got 2, or a photocopy as well, I would love to build up such a library.

HELP OFFERED:
If you are still having trouble deciphering your manual and could do without it for a few weeks or send me a copy, I would also be prepared to look at it and offer a method of translation to enable you to use the more common features of it. Send it in to the Users Group, Box 9592 Wellington - it's dryer than my home letter box. (Any hardware enthusiasts are welcome to make me a new one large enough to take books - just include a cable and software to light up my Beeb and make it sing sweetly "The Mail Has Arrived")

FINAL P.S. for OS 1.2:
If you are starting a program, or sending codes in immediate mode, the first code you send down will be VDU2. You can then send down all the VDU1s you like.

THE 1MHz BUS

TONY K. AUCKLAND

Tony has agreed to submit a series of articles on the 1MHz Bus over the next few months. The first....

PART ONE - ALLOW ME TO INTRODUCE JIM AND FRED

The One Megahertz Bus (or One Meg Bus for short) is an area of the BBC microc's address space reserved for hardware expansion. The 6502 microprocessor in the Beeb is capable of addressing 64K of address space. Within this address space, certain areas are designated for RAM, some for ROM and the rest for Input/Output (I/O) devices. Some of these devices already installed on the Beeb are the user port, the cassette port, the printer port and the analog to digital converter. These are all located within page &FE or, in simpler terms, the 256 bytes of memory whose address begins with &FE. This page of the system is affectionally known as Shiela.

Two other pages of memory are also reserved for I/O devices. These two pages are &FC (Fred) and &FD (Jim). Unlike Sheila any device that you want to put in these two pages has to be built externally to the system. This series of articles will cover the construction of various devices to go on the one meg bus together with the construction of a card cage to hold the devices.

WHY ONE MEG.?

The 6502 in the BBC normally runs at two megaherz or two million cycles per second. At this speed it will execute one machine language instruction every 500 billionths (American billionths for computers) of a second. Just as an aside, that means that the BBC executes instructions faster than a Z80 running at 4 Megahertz (MHz) due to the way that the different processors work. The BBC however slows down when it has to access any I/O device. This was done (says Acorn) to make the transfer of data to external devices more reliable. The 1 MHz bus gets its name from this slowing down of the system, that is the speed the system slows down to when accessing Fred and Jim. Unless you are into capturing very high speed data you will not notice the difference - the system is still executing one million instructions per second, fast enough for most tasks.

What Can I Put On The One Meg Bus?

Just about any device can be placed on the One Meg Bus. Some areas have already been allocated by Acorn. These are:

&FC00-&FC0F	Test Hardware
&FC10-&FC13	Teletext Decoder
&FC14-&FC1F	Prestel Modem
&FC20-&FC27	IEEE 488 Interface
&FC28-&FC2F	Acorn Reserved, currently unused
&FC30-&FC3F	Cambridge Ring Interface
&FC40-&FC47	Hard Disk Interface
&FC48-&FC7F	Acorn Reserved, currently unused
&FC80-&FC0F	Test Hardware
&FC90-&FCBF	Acorn Reserved, currently unused
&FCC0-&FCFE	USER APPLICATIONS
&FCFF	Paging Register for Jim

Articles have been published is a few electronics magazines about devices to place on the One Meg Bus. A lot of these projects use components that are hard to get in New Zealand. In this series I will be presenting some circuits of my own together with ideas from magazines, suitably modified to use components available in New Zealand.

WHAT DOES IT LOOK LIKE?

If you turn your Beeb over and look towards the front of the machine, you will see a row of connectors, the connector that all control and addressing information for Jim and Fred is routed. The functions of each of the pins is as follows:

A7	34	33	A6
A5	32	31	A4
A3	30	29	A2
A1	28	27	A0
0V	26	25	D7
D6	24	23	D5
D4	22	21	D3
D2	20	19	D1
D0	18	17	0v
ANALOG IN	16	15	0v
RST	14	13	0v
NPGFD	12	11	0v
NPGFC	10	9	0v
NIRQ	8	7	0v
NNMI	6	5	0v
1MHz	4	3	0v
R/NW	2	1	0v

Signal Connector Signal
Top Bottom

Each of these signals has a specific purpose, some are used to select devices, others are used to send information to those devices, while the rest are for control.

Lets look at the signal lines.

0v This line is used as the ground line. It is used to reduce the signal noise between adjacent active signal lines. (Signals tend to affect each other when travelling along parallel wires unless separated by a ground wire). It also acts to keep our external voltages referenced to the BBC's voltages - we do not want our external 5 volts to look like 10v to the BBC : that sort of thing tends to hurt computers.

R/NW This line is known as READ NOT WRITE or in more human terms, if the signal is high we are reading from the one meg bus, if it is low we are writing to the one meg bus.

1MHzE This is the system clock. It is used to make sure that all our data transfers occur at the correct time. Computers are rather fussy about the timing of information travelling to and fro so we use this clock to make sure our signals coincide.

NNMI Tricky little signal this, the Non Maskable Interupt (the first N means NOT or active low). If this signal is brought low then the processor will stop what it is doing and go away and start a new task. In the BBC this signal is reserved for the use of the filing system, so we won't touch it.

NIRQ Another tricky one, but we are going to have to play with this one. The line is Interrupt Request. With this line we can set up running control systems that will carry on running at the same time as other programs. Again the first N means active low.

NPGFC Not Page &FC, better kown as select page FRED. When this line is low we are addressing memory between &FC00 and &FCFF.

NPGFD Not Page &FD, select page JIM. When this line is low we are addressing memory between $FC00 and %FCFF.

NRST Not RESET, this line goes low evey time we a system reset occurs, eg. when you hit BREAK. This line is tied to the reset pins on all devices on the one meg bus so that they can be placed in a known state at any time. Note however this is a non selective reset, everything is reset at the same time.

ANALOG This line is tied to the speaker amplifier. If we make an external noise maker then the sound signal can be sent to the BBC's internal speaker.

D0-D7 The DATA bus. All the data and commands we wish to send to the devices on the one meg bus travel down these lines. The direction of data travelling down these lines is controlled by the R/W line.

A0-A7 The lower eight bits of the Address bus are used to address devices on the one meg bus. We only need eight because we are only addressing a small portion of memory.

Now that we have built up our specification we can think about the more practical side of putting things onto the one meg bus. Next month I will describe the construction of a small power supply that can be used to power our one meg bus devices, together with details of the Acorn/Cube Eurobus cardcage sustem and how to build your own card cage.

HELP WANTED

On browsing through some of the first membership renewals I picked up a number of areas in which people wanted help. Some of these are covered in this and next month's Beeblet. David J. of Dunedin wants a good method to implement CONT(inue) after STOP.

DISC DRIVES

Craig H. of Auckland would some advice on (a) How the price ($1150) of the slim line 400K drive units compares against other 400K drives, such as those from Mitsubishi.

(b) Given the apparent rapid acceptance of 3" drives in the UK, how long will it be before they hit NZ?

(c) alternative interface chips (see adverts in Micro User.)

If someone would like to do some research (including the reviews of Beeb disc interfaces featured in recent editions of UK magazines) I think a lot of people would be interested. My preliminary comments are:

(a) My Double Sided Double Density Shugart SA465 drives together cost me a little under $800. This did not include a case, power supply or cable. The current retail price for these drives is about $1000. They were purchased in February as part of a bulk purchase arranged by another Wellington microcomputer club, and more recently a number of Wellington Beeb members put through a second deal which also involved printers (an Epson clone, about $600) and video monitors. The catch in all this is the question of servicing - my drives are supposed to have a one year warrantee from the local Shugart agents (Warburton-Franki) however.

(b) There still seems to be a proliferation of different 3" drives. I would be inclined to wait until some sort of industry standard develops.

CASTLE OF RIDDLES
Steven J. would like to know whether anyone can get past the bear, or actually use the cylindrical cubicle marked "maze exit".

ALIEN INVASION, FARMING PROGRAMS, PROGRAMMING.
Michael G. of Rewa (near Feilding) has had problems with the "Alien Invasion" from Micro User, February 1984. The game runs to just after the directions and prints "Array at line 150". Rechecking the listing has not helped.

Michael is also interested in any farming related software, or programs which might readily be adapted for farm management etc. He would appreciate some tutoring in basic programming techniques from someone in his area.
- Sorry Michael, I didn't manage to get an article on structured *programming into this edition : my living room floor* is already carpeted with more pages than I could possibly fit into the April Beeblet. (Don't let this put you off sending in material - I still have a very long way to go for the May issue).

EPROM PROGRAMMER
MR Carter (64-398 Tokoroa evenings) would like anyone who has built the 'Electronics and Computing' BBC Eprom Programmer to contact him, especiallly if they have bug free copies of the two programs. He has been havings lots of problems.

PRINTERS
Allan C. of Christchurch is having difficulty linking the manual for his Super 5 - CP80 printer (Epson clone) to the UG. He is also thinking of writing a printerr driver for his View ROM.

Allan : I hope Anne's article on printers will help. Note her offer. A VIEW printer driver has been written for a Logitec printer (Epson look-alike) and I hope to get it into the next issue. -Ed.

HELP RECEIVED

ADVENTURING
Steven J. has completed 'Philosophers Quest' (4 days?!) and is willing to provide hints/tips to others. He also notes, "Find a safe place (ie. outside the Castle of Riddles, without wasting your lamp) and ask the computer to "GET" certain objects which you feel you need. The response will be either "I do not see that here", which means that the object exists but is elsewhere, or "I do not understand that" which means that the object does not exist in the adventure. A similar process to find verbs which may be used is to associate the verb with a known object. If the response is "You can't do that yet" then the

verb is acceptable. Try this method as it may provide clues to what may lie ahead. I am sure you will find this process useful if also a little tedious as I have already discovered five verbs and four objects which I have yet to encounter or use.

DISKS, MEMORY AND USER DEFINED KEYS

Wynne C. of Christchurch had the problem of wanting to look at the memory while building up an input but not having enough room reserved for user defined Keys. Solution : instead of putting the definitions in the Keys thmselves, Wynne has made for each Key a programme called *build "A",*build "B",etc. They can now be called by defining the keys each with the short definition `*KEY0*EXEC"A" :M` `*KEY1* EXEC"B" :M` and so on. (For : read broken vertical line Ed.)

PRINTERS

Lance A. of Wellington recently aquired a 'AMust 80DT' (emulates MX80) which evidently requires a STROBE pulse on the printer connector. His Beeb (a mid '83 model) did not provide this. His fix (does not to issues 1 and 3 of the BBC) was to cut a track and instal a link in the circuit board. Lance proceeded as follows (check out the warrantee situation first if you are contemplating hardware mods -Ed):

(i) Remove the BBC mains plug

(ii) Remove the BBC cover

(iii) Locate link 's1' on the far left side of the circuit board (next to the power supply). This consists of 3 soldered dots with a short pc track connecting the centre and rear dot (if your's has the centre and front dots connected then you should have the STROBE output, so replace the cover and find further help !)

(iv) If you are confident (able) remove the main circuit board, as it will make the following operations easier.

(v) Cut the track between the dots so there is no connection.

(vi) Now solder a link between the centre and the front dots.

STOP PRESS :

ANNUAL GENERAL MEETING

Our Annual General Meeting will be held on Thursday 28 June at 7.30pm at the Correpondence School Staffroom, Portland Crescent, Thorndon, Wellington.

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MEASURING TEMPERATURE

Don F. (Tokoroa) and Warren W.

The following article is based upon material supplied by Don and extended by Warren.

A PRACTICAL USE FOR THE ANALOGUE TO DIGITAL CONVERTER

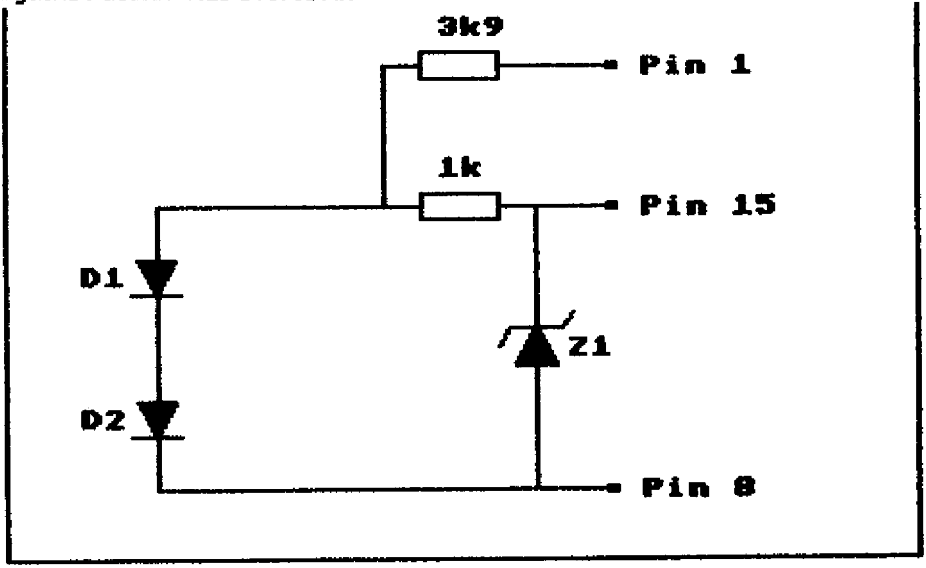
Here is a simple and inexpensive way of using the BBC Microcomputer to measure temperature. It relies on the fact that the forward voltage drop across a silicon diode decreases with increasing temperature. This voltage drop is measured using one Analog to Digital channel, and converted to a temperature value and displayed graphically on the screen.

THEORY

If a constant current is applied to a forward biased silicon diode then the voltage drop accross the diode decreases with increasing temperature at the rate of about 2mV/degree C. For a current of 1 mA the voltage drop is about 700mV at 0 degrees C decreasing to around 500mV at 100 degrees C.

THE CIRCUIT

We can take advantage of the 1.8 volt range of the analog input circuit by connecting two diodes in series. Most silicon diodes would work, but 1N4148 or 1N4151 are suggested. The constant current source is taken from the +5v output on the analog port. The 3K9 resistor applies the voltage developed across the diodes to the analogue port input. Incidently, the analogue ports have an input impedance of around 10 Megohms. The 3.3v zener diode protects the analogue port against accidental overload.



```
   10 REM Temperature v. Time Graph P
lot
   20
   30 MODE 1
   50 DIM V(5)
   60 PROCtime
   70 PROCaxes
   80 PROCdraw
   90 END
  100
  110 DEF PROCtime
  120 CLS
  130 INPUT TAB(13,15) "How long (sec
s) ? " H%
  140 CLS
  150 ENDPROC
  160
  170 DEF PROCaxes
  180 CLG
  190 MOVE 200,100
  200 DRAW 1200,100
  210 MOVE 200,100
  220 DRAW 200,1070
  230 VDU 5
  240 FOR T=10 TO 100 STEP 10
  250   MOVE -170,(9*T)+100
  260   PRINT T
  270   GCOL 0,1
  280   MOVE 100,9*T+100
  290   PLOT 21,1200,9*T+100
  300   GCOL 0,3
  310   NEXT T
  320 FOR C=0 TO H% STEP 20
  330   MOVE 1000*C/H%-100,90
  340   PRINT C
  350   MOVE 1000*C/H%+200,100
  360   DRAW 1000*C/H%+200,120
  370   NEXT
  380 GCOL 0,1
  390 FOR C=5 TO H% STEP 5
  400   MOVE 1000*C/H%+200,100
  410   PLOT 21,1000*C/H%+200,1000
  420   NEXT C
  430 GCOL 0,3
  440 MOVE 0,870
  450 GCOL 0,2
  460 PRINT "Temperature"
  470 MOVE 1000,30
  480 PRINT "Time"
  490 VDU 4
  500 ENDPROC
  510
  520 DEF PROCdraw
  530 VDU 28,4,31,30,30
  540 PRINT "Press SPACEBAR to measur
e"
  550 REPEAT
  560   F=INKEY(0)
  570   UNTIL F=32
  580 CLS
  590 VDU 26
  600 MOVE 200,100
  610 I=TIME
  620 FOR T=0 TO H%
  630   REPEAT
  640     UNTIL TIME>=I+T*100
  650   W=0
  660   FOR D=1 TO 5
  670     J=TIME
  680     V(D)=ADVAL(1)*1.8/65520
  690     W=W+V(D)
  700     REPEAT
  710       UNTIL TIME>=J+4
  720     NEXT
  730   V=W/5
  740   temp=331-250*V
  750   DRAW 200+T*1000/H%,temp*10+10
0
  760   SOUND 1,-5,100,2
  770   NEXT
  780 ENDPROC
```

SCOOP! - ACORN'S POCKET NEUTRINO

G.C.F.

INTRODUCTION

When Chris Hauser was in NZ earlier this year he let me have a look at a very advanced prototype of a pocket computer. (He and I studied physics at university). You can imagine how excited I was! But I was not allowed to divulge details before the official Electron launch in NZ. Since the Electron is scheduled to be officially launched later this month...

When Rockwell released a low power CMOS version of the 6502 (designated a R65C02 - see BYTE magazine December'83 p.443), Acorn jumped at the chance to produce a pocket computer with advanced features. The R65C02 and other low power components allow the production of a battery-operated computer with a surprisingly large subset of Beeb features. The recent development of LCD displays of very high resolution saw the last requirement met.

APPEARANCE:

The size of your common paperback (slightly thicker) with firm Beeb-cream-coloured vinyl covers, it has a tastefully-lettered title down its spine "Neutrino by Acorn" and the traditional Acorn symbol embossed on what might be the front cover. To use, you open it up and the 150mm flat screen is on the inside of the front cover, with the keyboard facing on the thicker 'back' cover. There is provision for an optional plug-in cartridge system to the left of the keyboard. On the extreme right hand edge there seems to be provision for some as-yet-unspecified interface port.

The screen allows a resolution of 320 x 256 pixels - the same as MODE 4. In fact Modes 4 and 6 are the only ones available. This screen offers you a choice of either black or white (shades of Henry Ford - He said you could have any coloured car provided it was black!) The good news is that all the graphics commands of BBC BASIC can be used, though with actual colour 0 interpreted as black, any other colour number is interpreted as white - except numbers 8 and 15 which generate flashing black-white! Chris says that an optional extra will be available later to drive a TV or RGB monitor.

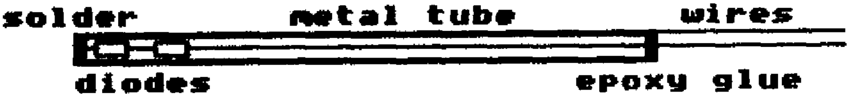
The keyboard has very nearly the same number of keys as the Electron, and looks suspiciously as though Hewlett Packard had a hand in its design. It also has two keys not found on Beeb or Electron, but as there are bound to be some minor changes before production I'll say no more about these.

By the time you read this Acorn will have decided whether to release the 'Neutrino' with two of the planned interfaces fitted, or to market

CONTINUED ON PAGE 39

CONSTRUCTION

With a bit of care the resistors and zener diodes can be mounted inside the analogue port plug body, with two wires coming out to the probe. The probe need only comprise a tube in which to mount the diodes. You could use a plastic or glass tube sealed at the end, or a thin walled metal tube arranged as shown.



SOFTWARE

The program is structured as three procedures. The first, PROCtime, asks for the duration of the plot in seconds. (If you wish to have a plot in minutes or hours, you should multiply the delay in line 640 by 60 or 360.)

PROCaxes draws and labels the horizontal and vertical axes, and draws a grid.

PROCdraw asks you to press the spacebar to start the graph, then, at one second intervals, it calculates the average of 5 consecutive readings of the voltage, converts to temperature and plots the temperature value.

Line 740 converts from voltage to temperature, and should be altered to suit the characteristics of the diodes concerned.

To calibrate the probe, first insert it in melting ice and note the value of

V0 = ADVAL(1)*1.8/65520

Next place the probe in boiling water and note

V100 = ADVAL(1)*1.8/65520

Line 740 takes the form:-

temp - A + B * V

where A = 100*V0/(V0-V100)
and B = 100/(V0-V100)

PRINTING CHINESE WITH THE BBC MICROCOMPUTER

David F

Chinese words or characters are composed of simple graphic elements: these are dots, dashes, longer horizontal or vertical lines, lines slanting to left or right and lines which change directions.

Such graphic elements can therefor be drawn or written by the computer's DRAW or PLOT commands as demonstrated in this program.

The Chinese words are first drawn on graph paper, each word in a 20 x20 grid. The X and Y coordinates of the origin and the end of each stroke are entered as Data (lines 2100,2110). The mechanics of drawing are set out in PROCwrite (1420-1490).

The 20x20 grid is set in a block of 24 pixils wide (E%) and 26 pixils high (H%) for spacing between characters and lines. This is however not quite legible and scaling (S%) up is necessary. Because the addressable points for the pixils are not square (4x2),scaling by odd numbers distorts the symmetry of the characters,the scaling is therefor made even by a factor of two (line 690).

PROCsetup (650-800) initialises the word size, defines the variables and centres the word on the screen if only one word can be accommodated (770-780).

The variables are:

C% = the left edge of the screen
D% = the last word position on the right
F% = the upper most word position
G% = the lowest word position
A% = the horizontal origin of the cursor
B% = the vertical origin of the cursor

EDITING is done by moving the cursor using the cursor Keys. A Chinese word can be written (by inputing a word code%) above the cursor or a word can be deleted by using the red function Key (f0). Words of different sizes can be written on the same screen by pressing Key (f2) and enter a new scale (S%), a new cursor will appear on the Right lower corner so that it would not over-write what is already on the screen.

To write on a clean screen press Key (f1) which CLS and re-run the program. To END with all default parameters restored use Key (f9). The program also provides facility for dumping the screen on printer

(PROCdump 1740-1790) but you need to provide your own screen-dump program and enter its address in line 1770.

The model B Beeb can just accommodate this programme in mode 0. If you put in modifications or add other features then you will have to break the programme at line 340 and Chain the lower half. You can of course use other modes with a little experimenting and modification and the effects could be quite interesting.

Editing functions are simply redefining the cursor keys to move the cursor to any position on the screen. *Key 9 (f9) deletes the word above the cursor. *Key 2 (f2) goes back to line 370 (PROCsetup) to change the word size by inputing a new scale S%; to avoid erasing words already on the screen the current cursor is put to the right lower corner after a scale change (line 400).

Have fun!

Editors note: I did ! Delayed Beeblet a bit though... David has indicated that he would be prepared to provide copies of the program. He has suggested a charge of $2-00 to go into club coffers. You provide the tape/disc. Wellington members could obtain their copies at the next meeting.

```
  10 MODE 7
  20 PRINT TAB(3,6);CHR$141;CHR$134;"BBC MICROCOMPUTER USERS GROUP"
  30 PRINT TAB(3,7);CHR$141;CHR$134;"BBC MICROCOMPUTER USERS GROUP"
  40 PRINT TAB(12,13);CHR$141;CHR$132;"IN CHINESE"
  50 PRINT TAB(12,14);CHR$141;CHR$132;"IN CHINESE"
  60 PRINT TAB(5,20);"DESIGNED BY DAVID F. FEB.1984"
  70 Q$=INKEY$(600)
  80 CLS
  90 PRINTCHR$133;"USE THIS PROGRAM TO DISPLAY EXAMPLE    ";CHR$133;"CHINESE CH
ARACTERS ON THE SCREEN."''
 100 PRINT"THE LETTERS B AND C AND THE CHINESE     CHARACTERS ARE CODED BY NUMB
ERS         FROM 1 TO 11."'
 110 PRINT"EDITING IS DONE BY MOVING THE CURSOR"
 120 PRINT"WITH THE CURSOR KEYS THEN DELETE THE"
 130 PRINT"CHARACTER WITH f0 AND ENTER THE NEW ONE"''
 140 PRINT"f0 ERASES THE CHARACTER ABOVE THE CURSOR"
 150 PRINT"f2 ENABLES CHANGING OF SCALE"
 160 PRINT"   SO THAT WORDS OF DIFFERENT SIZES"
 170 PRINT"   CAN BE WRITTEN ON THE SAME SCREEN"
 180 PRINT'"f9 ENDS THE PROGRAM"''
 190 PRINT TAB(4,23)"PRESS ANY KEY TO CONTINUE";:K=GET:CLS
 200 PRINT"THE WORD CODES ARE:"
```

```
  210 PRINT'"1       = B"
  220 PRINT"2       = C"
  230 PRINT'"3 and "
  240 PRINT"4       = MICRO-  (2 characte
rs)"
  250 PRINT'"5"
  260 PRINT"6 and"
  270 PRINT"7       = COMPUTER  (3 charac
ters)"
  280 PRINT'"8 and "
  290 PRINT"9       = USERS  (2 character
s)"
  300 PRINT'"10 and "
  310 PRINT"11      = GROUP  (2 character
s)"
  320 PRINT''f5 CALLS FOR YOUR OWN SCREEN
 DUMP":PRINT"   ADDRESSED IN LINE 1620"
  330 PRINT''PRESS ANY KEY TO CONTINUE"
  340 K=GET
  350 *FX4,2
  360  *KEY 0 98 |M
  370  *KEY 1 91 |M
  380  *KEY 2 96 |M
  390  *KEY 5 97 |M
  400  *KEY 9 99 |M
  410 *KEY 12 92 |M
  420 *KEY 13 93 |M
  430 *KEY 14 94 |M
  440 *KEY 15 95 |M
  450 :
  460 MODE 0:VDU23,1,0;0;0;0;
  470 VDU 28,0,31,79,30:code%=0
  480 REPEAT
  490   IF code%=91 CLG
  500   PROCsetup
  510   REPEAT
  520     PROCcursor
  530     REPEAT
  540       INPUT" Edit keys: Cursors, f0
=delete, f1=rerun, f2=change size, f5=dum
p, f9=End                   Word codes: 1 t
o 11 (return)  ",code%
  550         UNTIL code%>0 AND code%<12
OR code%>90 AND code%<100
  560     PROCclear
  570     PROCedit
  580     IF code%>0 AND code%<12 THEN PR
OCwrite
  590     UNTIL code%=96 OR code%=99 OR c
ode%=91
  600   UNTIL code%=99
  610 PROCend
```

```
  620 END
  630 :
  650 DEF PROCsetup
  660 REPEAT
  670   COLOUR 129:COLOUR 0:INPUT'''"
 Size of Characters:  1 to 10 (return)
",S%
  680   UNTIL S%>0 AND S%<19
  690 S%=S%*2
  700 C%=0
  710 E%=S%*24
  720 D%=E%*INT(1280/E%)-E%
  730 H%=S%*26
  740 F%=1023-H%
  750 G%=1023-H%*INT(960/H%)
  760 B%=F%:A%=C%
  770 IF E%>640 THEN D%=(1280-E%)/2
  780 IF H%>480 THEN G%=F%-((960-H%)/2)
  790 IFcode%=96 OR E%>640 OR H%>480 THEN
A%=D%:B%=G%
  800 ENDPROC
  810 :
  880 DEF PROCcursor
  890 MOVE A%+E%,B%+1
  900 MOVE A%,B%+1
  910 PLOT 85,A%+E%,B%+3
  920 PLOT 85,A%,B%+3
  930 ENDPROC
  940 :
  950 DEF PROCclear
  960 PLOT 87,A%+E%,B%+1
  970 PLOT 87,A%,B%+1
  980 ENDPROC
  990 :
 1000 DEF PROCedit
 1010 IF code%=98 PROCdelete
 1020 IF code%=97 PROCdump
 1030 IF code%=92 PROCleft
 1040 IF code%=93 PROCright
 1050 IF code%=94 PROCdown
 1060 IF code%=95 PROCup
 1070 ENDPROC
 1080 :
 1100 DEF PROCdelete
 1110 MOVE A%+E%,B%
 1120 MOVE A%,B%
 1130 PLOT 87,A%+E%,B%+E%
 1140 PLOT 87,A%,B%+E%
 1150 ENDPROC
 1160 :
 1170 DEF PROCleft
```

```
 1180 A%=A%-E%
 1190 IF A%<C% AND B%>=F% THEN A%=C%
 1200 IF A%<C% AND B%<F% THEN B%=B%+H%:A%
=D%
 1210 ENDPROC
 1220 :
 1230 DEF PROCright
 1240 A%=A%+E%
 1250 IF A%>D% AND B%=G% THEN A%=D%:VDU7
 1260 IF A%>D% AND B%>G% THEN A%=C%:B%=B%
-H%
 1270 ENDPROC
 1280 :
 1290 DEF PROCup
 1300 IF B%<F% AND NOT(H%>480) THEN B%=B%
+H%
 1310 ENDPROC
 1320 :
 1330 DEF PROCdown
 1340 IF B%>G% THEN B%=B%-H%
 1350 ENDPROC
 1360 :
 1400 DEF PROCwrite
 1410 PROCword
 1420 RESTORE data%
 1430 REPEAT
 1440   READ X%,Y%,Z%
 1450   X%=X%*S% : Y%=Y%*S%
 1460   X%=X%+A% : Y%=B%+E%-Y%
 1470   IF Z%=1 MOVE X%,Y%
 1480   IF Z%=2 DRAW X%,Y%
 1490   UNTIL Z%=3
 1500 PROCright
 1510 ENDPROC
 1520 :
 1530  DEF PROCword
 1540 IF code%=1 data%=2010
 1550 IF code%=2 data%=2020
 1560 IF code%=3 data%=2030
 1570 IF code%=4 data%=2040
 1580 IF code%=5 data%=2050
 1590 IF code%=6 data%=2060
 1600 IF code%=7 data%=2070
 1610 IF code%=8 data%=2080
 1620 IF code%=9 data%=2090
 1630 IF code%=10 data%=2100
 1640 IF code%=11 data%=2110
 1650 ENDPROC
 1660 :
 1670 DEF PROCend
 1680 *FX 4,0
 1690 *FX18
 1700 VDU7
 1710 VDU 22,7:REM CHANGE TO MODE 7
 1720 ENDPROC
 1730 :
 1740 DEF PROCdump
 1750 COLOUR 128:COLOUR 0:PRINT''
 1760 PROCclear
 1770 CALL &C01
 1780 COLOUR 129:COLOUR 0
 1790 ENDPROC
 1800 :
 2010 DATA 1,20,1,1,1,2,17,1,2,20,6,2,17,
10,2,2,10,2,2,11,2,17,11,2,20,15,2,17,20,
2,2,20,2,2,2,2,17,2,2,19,6,2,16,11,2,19,1
5,2,16,19,2,2,19,2,0,0,3
 2020 DATA 19,6,1,13,1,2,8,1,2,3,5,2,1,9,
2,1,12,2,3,16,2,8,20,2,13,20,2,19,15,2,18
,15,2,13,19,2,8,19,2,4,16,2,2,12,2,2,9,2,
4,5,2,8,2,2,13,2,2,18,6,2,0,0,3
 2030 DATA 5,1,1,1,5,2,6,5,1,1,10,2,4,7,1
,4,20,2,8,2,1,8,6,2,12,6,2,12,2,2,10,1,1,
10,6,2,7,9,1,13,9,2,6,20,1,8,17,2,8,11,2,
12,11,2,12,18,2,15,16,2,18,1,1,13,12,2,15
,7,1,20,7,2,19,7,1,14,20,2,15,9,1,20,20,2
,0,0,3
 2040 DATA 2,2,1,11,2,2,1,7,1,12,7,2,4,2,
1,4,10,2,1,14,2,9,2,1,9,12,2,14,3,1,14,10
,2,18,1,1,18,13,2,16,12,2,4,15,1,16,15,2,
10,13,1,10,20,2,1,20,1,20,20,2,0,0,3
 2050 DATA 4,3,1,7,6,2,6,6,2,1,8,1,7,8,2,
7,19,2,10,16,2,10,8,1,20,8,2,15,1,1,15,20
,2,0,0,3
 2060 DATA 6,1,1,1,6,2,4,3,1,10,3,2,5,4,1
,7,6,2,15,1,1,10,6,2,13,3,1,20,3,2,14,4,1
,16,6,2,5,7,1,5,13,2,16,13,2,16,7,2,5,7,2
,5,9,1,16,9,2,5,11,1,16,11,2,1,16,1,20,16
,2,7,14,1,7,16,2,4,20,2,14,14,1,14,20,2,0
,0,3
 2070 DATA 2,6,1,8,6,2,5,1,1,5,20,2,1,14,
1,5,9,2,6,9,2,8,11,2,7,20,1,10,17,2,10,3,
2,16,3,2,16,20,2,20,20,2,20,19,2,0,0,3
 2080 DATA 1,20,1,3,15,2,3,1,2,19,1,2,19,
20,2,17,18,2,3,6,1,19,6,2,3,11,1,19,11,2,
11,1,1,11,20,2,0,0,3
 2090 DATA 4,4,1,15,4,2,1,8,1,20,8,2,9,1,
1,9,8,2,18,1,1,1,14,2,4,20,1,4,12,2,17,12
,2,17,20,2,4,20,2,4,16,1,17,16,2,0,0,3
 2100 DATA 1,3,1,9,3,2,2,3,1,2,16,2,8,3,1
,8,20,2,2,7,1,8,7,2,2,11,1,8,11,2,1,17,1,
8,15,2,12,1,1,14,4,2,19,1,1,16,4,2,11,6,1
;19,6,2,10,11,1,20,11,2,15,6,1,15,12,2,10
,20,2,15,12,1,20,20,2,0,0,3
 2110 DATA 11,1,1,1,12,2,10,2,1,20,12,2,6
,9,1,14,9,2,2,14,1,19,14,2,8,14,1,4,19,2,
17,19,2,15,17,1,18,20,2,0,0,3
```

TOOL BOX

Reviewed by Paul H. Wellington.

TOOL BOX, BBC Soft, $84-00 (Whitcoulls, Lampton Quay)
Cassette plus 207 page Manual.

My first impression of the TOOL BOX was that it was a very professional package and that it contained many useful routines. The package comes with a tape and a book. The book is just like a smaller User Guide, mainly made up of listings of the programs. The tape contains one copy of the basic programs and two of each machine code program.

The programs are:

Chargen: A basic program, which helps users generate their own defined characters. Including Rotate, Mirror image, copy of other character, and VDU23 of character.
Circle: (Basic) This program draws two circles using different methods (in procedures), fills them and shows how long it took.
Xref: (Mach/code) This will display either the lines or just the line numbers, that hold any sequence of program.
Disass: (Basic) This will disassemble a block of memory into assembler mnemonics, allows them also to be SPOOLed EXECed and assembled.
Giant1: (Basic/Mach) Creates large characters in Modes 0,1 & 4.
Giant2: (Basic/Mach) Does the same as Giant1 but Modes 2 and 5
Grafprt: (Mach/code) Dumps any graphics screen to a printer.
Packer: (Mach/code) Packs as many basic lines onto one line as it can.
Ramtest: (Mach/code) Puts codes into as much memory as it can then checks the memory for faults.
Remstrp: Mach/code) Strips REMs out of basic programs.
Replace: (Mach/code) This replaces any sequence of a program for another, throughout the program.
Reseq: (Mach/code) This program will resequence a part of a basic program given the start, the finish, and the new place. It also automatically RENUMBERs the program.
Shaper: (Basic) This copies a shape into your user defined characters and then lets the user print it anywhere on the screen as a string.
Twist: (Basic/Mach) This program generates a letter script then turns it on its side any text also is displayed twisted sideways.

A selection of BASIC sorting routines:

Bublsrt: A bubble sort. Slctsrt: A select sort.
Indxsrt: An index sort. Shelsrt: A shell sort.
Shl2srt: Another shell sort.
Quiksrt: A quick sort.
Heapsrt:A heap sort.

Spacer:(Mach/code) Adds spaces to a basic program, before and after Keywords.
Crunch: (Mach/code) Removes all spaces from a basic program. Speak: (Basic/Mach) Provides a way of producing a fully expanded version of any number typed.
Unpack: (Mach/code) Divides multi-statement lines into single statement lines. Vardump: (Mach/code) Dumps to the screen all the variables a program has created.

In general the utilities are all useful. Care has been taken to minimise unwanted results, through error trapping and warnings in the book. The machine code programs are normally used in conjunction with a function key which has to be correct. While there are two versions of each utility, one for tape users and one to transfer to disk, some of the latter did not appear to work. Also, they were only of any use as utilities in their object form, but the book gave a full source listing which could be looked at for some useful machine code programming techniques.

The Basic programs (including those which were half basic-half mach/code) were clearly documented, and except Chargen and Disass, had procedures to be used in user's programs. I thought that the sort routines are the weakest part of the package. They were poorly documented, badly explained and not really optimised at all. They also took up a significant part of the package, yet there is only a comparison table relating them over three types of data.

I used the package in conjunction with my disk system so M/C utilities could be executed easily by name (e.g *Reseq), but the programs could easily be moved around and need not be loaded in every time they had to be used. As well as the ease of disks one or two of the programs used 1.2 features and no alternative was offered for users without this OS.

The part of the TOOL BOX package I used the most were definitely the mach/code utilities, which I think should have already been in the BBC's editor: Reseq Replace and even Xref. The 'squeezing' utlities could also have some limited use. However, I found the layout of the routines confusing (I have summarised them in their tape order). TOOL BOX also does not seem to have been designed with any specific user in mind. This means many people will only use three-quarters of the routines, or less.

Nevertheless, the programs are thoroughly debugged - TOOLBOX is generally a good professional package.

CONTINUED FROM PAGE 31

them as A and B models. (A suggestion that they be called the "Neutrino" and "Neutretto" was vetoed by Herman Curry.) These two interfaces are the plug-in cartridge interface, and a general bus port - the latter would be used to fit an expansion module. Unfortunately, I can't quite remember where the tv/RGB interface fitted in. Knowing Acorn, these extra bits will be late in arriving anyway.

LANGUAGE:

This appears to be Beeb-BASIC II. The lack of colour screen has already been mentioned, but the apparent lack of sound facilities may be a disappointment to many, but a relief to others. However, the ENVelope and SOUND commands do not generate error messages - perhaps another optional extra to come? As there was no way of transferring Beeb programs easily, it was not possible to check the degree of compatibility.

OPERATING SYSTEM

This appears to be a much reduced subset of the commands and *FX calls we are accustomed to. Not surprisingly, there are a couple of new ones, specific to the Neutrino.

INSIDE

Unfortunately, my hardware knowledge is limited to changing domestic fuses, which this does not appear to need. There appear to be only 5 chips inside, one of which is rather massive (a ULA?) It seems that ULAs are gobbling up the functions of other chips at a phenomenal rate. (Next, they'll be selling ULAs with built-in screen and keyboard?)

SPEED

The Neutrino is about half the speed of a Beeb, but about 5% faster than the Electron running in Mode 4. This is surprising, as the R65C02 is actually running at 1.8 MHz which is 10% slower than the Electron. Chris says they had one prototype cranked up to 2.3MHz running ok, but this was above the design specs and could not be guaranteed as reliable with "standard" components.

FINALLY

Although price was not mentioned, it is clearly destined to outsell the ZX81. This should not have too great an impact on Electron sales because of the reduced number of features. (It has 32K RAM). It will appear to appeal to those people who would really like to have a truly portable Beeb (or Electron) so long as they could work within its limited features. For this latter to come about, Acorn will have to provide an easier method of transferring programs other than by typing them in! The availablility of the ROM cartridge will make owners of EPROM burners very popular for transferring software.

Please don't write to Barsons for more details; we can expect an official press release just before the official launch.

USER GROUP MEETINGS

AUCKLAND:-meets 2nd Wednesday of the month, 8.00pm, VHF clubrooms, Hazel Ave, Mt Roskill. ph Dave 770-630 x 518(bus) or Kerry 695-355.

HAMILTON:-last Thursday of the month 4.45pm Waikato Tech B-block staffroom. Ph. Peter, Hamilton 392-500 x 897(bus) or Alison, Morrinsville 6695.

TAURANGA:-every second Wednesday. ph. Chris & Jane 65-076.

HAWKES BAY:-Alternative months Hastings & Napier. Contact Kendall Napier 435-624, Bob Taradale 446-955, Mitch Hastings 778-235.

TAUPO:-CONTACT Dave 84-215.

WELLINGTON:-meets LAST Thursday of the month, 7.30pm, Correspondence School staffroom (1st floor), Portland Cres, Thorndon. ph. Anton 286-289 or Warren 787-005.

CHRISTCHURCH:-fortnightly workshops, Monday 6.30pm at Hagley High School. ph. Michael 582-267.

OTHER CENTRES:- let us know and we will publish details here.

THE NEWSLETTER:

CONTRIBUTIONS:-most welcome. Listings should be sent in on tape or disc.(Tape - 2 copies,one at 300 baud please). A 35c stamp gets your tape / disc returned too. Please include written explanation of listing; text only material welcome too.

DEADLINES:- For a particular issue, the last day for material is the last day of the month prior to publication.

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Membership of the users group is on payment of an annual subscription from April to March. For the 1984/5 year it is: $30.00, plus a $5.00 joining fee for new members, plus $5.00 for Auckland & Wellington members as a local branch levy, which entitles attendance at meetings as detailed above. Renewing members get all back issues of the current year; New members get ALL back issues to v.1 #1 Jan '83.

THE BBC MICROCOMPUTER USERS GROUP OF NZ INC
P.O.Box 9592
Wellington

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